

## Design of primers for identification of honey bee viruses in multiplex-PCR

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### Abstract

This paper is devoted to the design of primer oligonucleotide sequences for their use in the genetic identification of Sacbrood virus, Chronic bee paralysis virus, Black queen cell virus and Deformed wing virus using multiplex-PCR. As a result of the bioinformatic analysis, the design of the oligonucleotide primers was performed; the designed primers had similar annealing temperatures (55 C), which makes it possible to indicate each of the viruses under the same PCR conditions. Most of the known strains and isolates of these viruses are amplified with this complex of oligonucleotide primers. Nucleotide sequences of designed primers and a universal positive control allow for the genetic identification of each of the biopathogens under the same PCR conditions at a multiplex format.

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### Keywords

*Apis mellifera* L., Black queen cell virus, Chronic bee paralysis virus, Deformed wing virus, Sacbrood virus

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